

N93-26481

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**OLYMPUS/ACTS SCINTILLATION EXPERIMENT****AT THE LEWIS RESEARCH CENTER**

NOULIE THEOFYLAKTOS

SATELLITE/LOCATION: OLYMPUS, 19° WEST

RECEIVE TERMINAL LOCATION: CLEVELAND, OHIO

ANTENNA SITE LONGITUDE: 81.8656° WEST

LATITUDE: 41.4125° NORTH

HEIGHT: 790 FEET ABOVE SEA LEVEL

ANTENNA ELEVATION: 11.5°

AZIMUTH: 108.73° CLOCKWISE FROM NORTH


RF: 29.655 589 GHZ

1ST IF: 2.145 589 GHZ

2ND IF: 0.160 000 GHZ

WAVELENGTH: 10.11 MM

DOWNLINK POWER BUDGET



SYSTEM NF(*)	5.8	dB
SATL. EIRP (CLEV.)	16.0	dBW
FREE SPACE PATH LOSS	-214.1	dB
POINT/POLAR/ATM LOSS	-0.9	dB
4-FT ANT. DIRECTIVITY	48.9	dB _I
ANT. FEED INPUT (CLEV.)	-120.1	dB _M
$1/T_{\text{SYS}}$	-29.1	dB/K
G/T	19.8	dB/K
BOLTZMANN'S K	-198.6	dB _M /K-Hz
$N_0 (K \cdot T_{\text{SYS}})$	-169.5	dB _M /Hz
C/ N_0	49.4	dBHz
C/N (BW=800 Hz)	20.4	dB
RCVR DYNAMIC RANGE ($2B_L=30$ Hz)	34.6	dB

(*) REFERENCED TO THE INPUT OF THE ANTENNA FEED



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COMPUTER: APPLE MACINTOSH II
ACQUISITION BOARD: NATIONAL INSTRUMENTS
SOFTWARE: LABVIEW 2.0

1400-MR MICRODYNE RECEIVER

RF: 160 MHz, IF: 20 MHz 800 Hz WIDE

PM DEMODULATOR WITH AUTOMATIC PHASE CONTROL

AGC DERIVED FROM ENVELOP AND SYNCHRONOUS AM DETECTORS

SYNCHRONOUS DETECTOR INCREASES SENSITIVITY BY 15 DB WHEN IN PHASE LOCK

AGC TIME CONSTANT OF 10 MS USED WITH NARROW IF BPF FOR STABILITY



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SAMPLING RATE: 10 SAMPLES/SEC

ANTI_ALIASING POSTDETECTION 8-POLE, 6-ZERO ELLIPTIC LPF

FILTER SET AT $F_r=2.8$ Hz WITH $F_{-3dB}=3.16$ Hz AND $F_{-80dB}=4.96$ Hz

(.5 LSB=1.22 mV/FULL ADC SCALE=10 V)=-78.25 dB

CONSTANT DELAY OF .8 SEC TO 1.4 Hz

APPROX. 24 MBYTES OF HD SPACE ARE AVAILABLE FOR DATA STORAGE
OR 2 WEEKS OF CONTINUOUS DATA ACQUISITION OF .1 SEC SAMPLES

174

AVERAGE SIX (6) 8K FFT'S WITH 50% OVERLAPPING OF 8K TIME RECORDS

FFT RESOLUTION: 10 Hz/8192 OR .00122 Hz

28672 TIME SAMPLES ARE USED FOR ONE (1) AVERAGED FFT PLOT

TOTAL TIME OF ONE FFT 47 MIN. 50 SEC.

VARIABLE FREQUENCY WINDOW LINEAR REGRESSION CALCULATES MAX SCINTILLATION
SLOPE



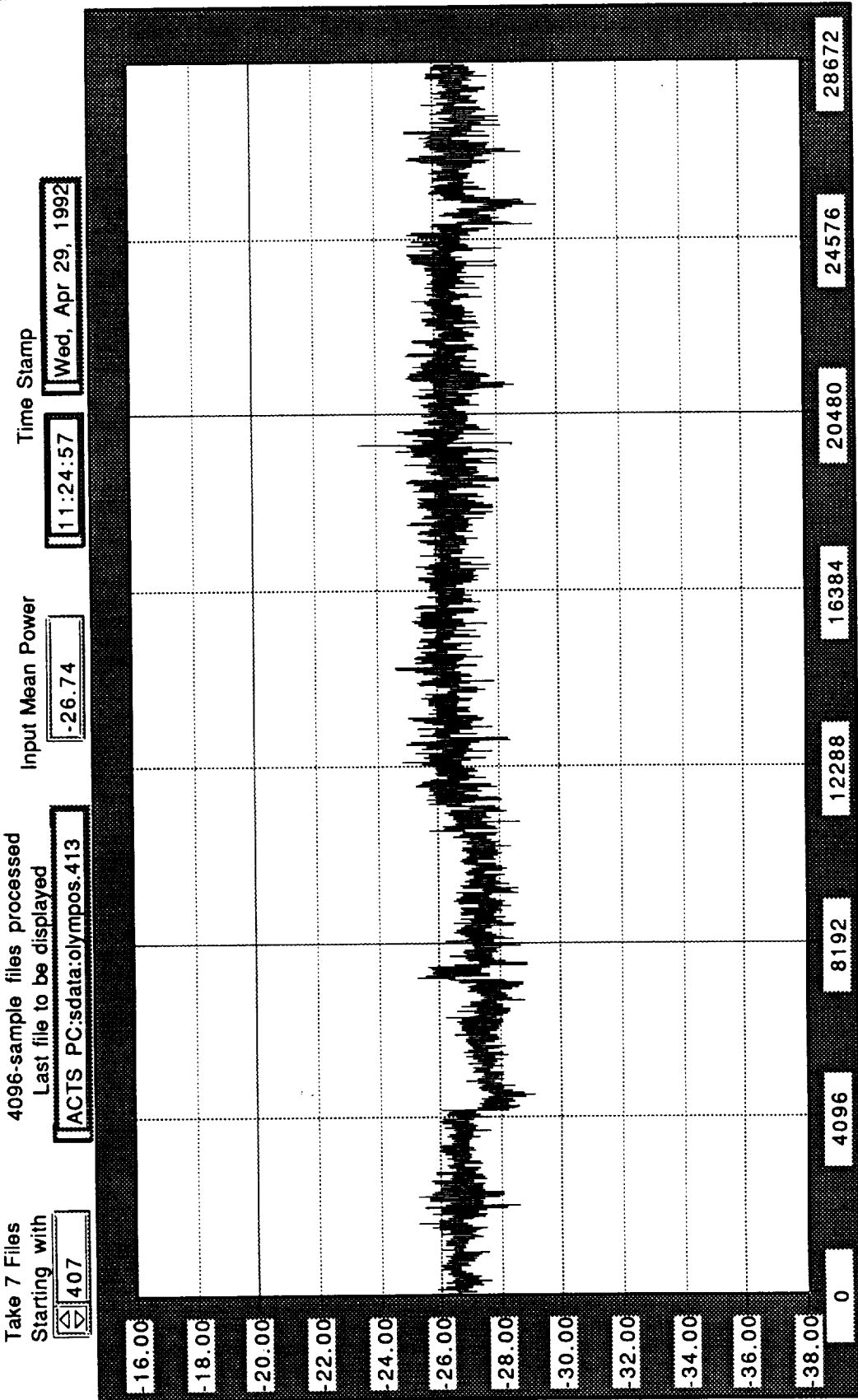
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- o DURING LAST 14 DAYS OLYMPUS BEACON SIGNAL ACQUISITION COMPUTER RECORDED 15 EVENTS WITH SCINTILLATION SLOPES ≤ -2.00 BUT ONLY 1 EVENT WHERE SLOPE < -2.67 ($-8/3$).
- o WHILE RECEIVER WAS PHASE-LOCKED
 - MAXIMUM SLOPE EVER RECORDED 3.31 (FROM 8K FFT'S)
 - MINIMUM SLOPE EVER RECORDED 0.16 (FLAT SPECTRUM--PREDOMINANCE OF FRONT-END NOISE)
- o LOST RECEIVER LOCK/ACQUISITION TWICE OVER BOTH WEEKENDS:

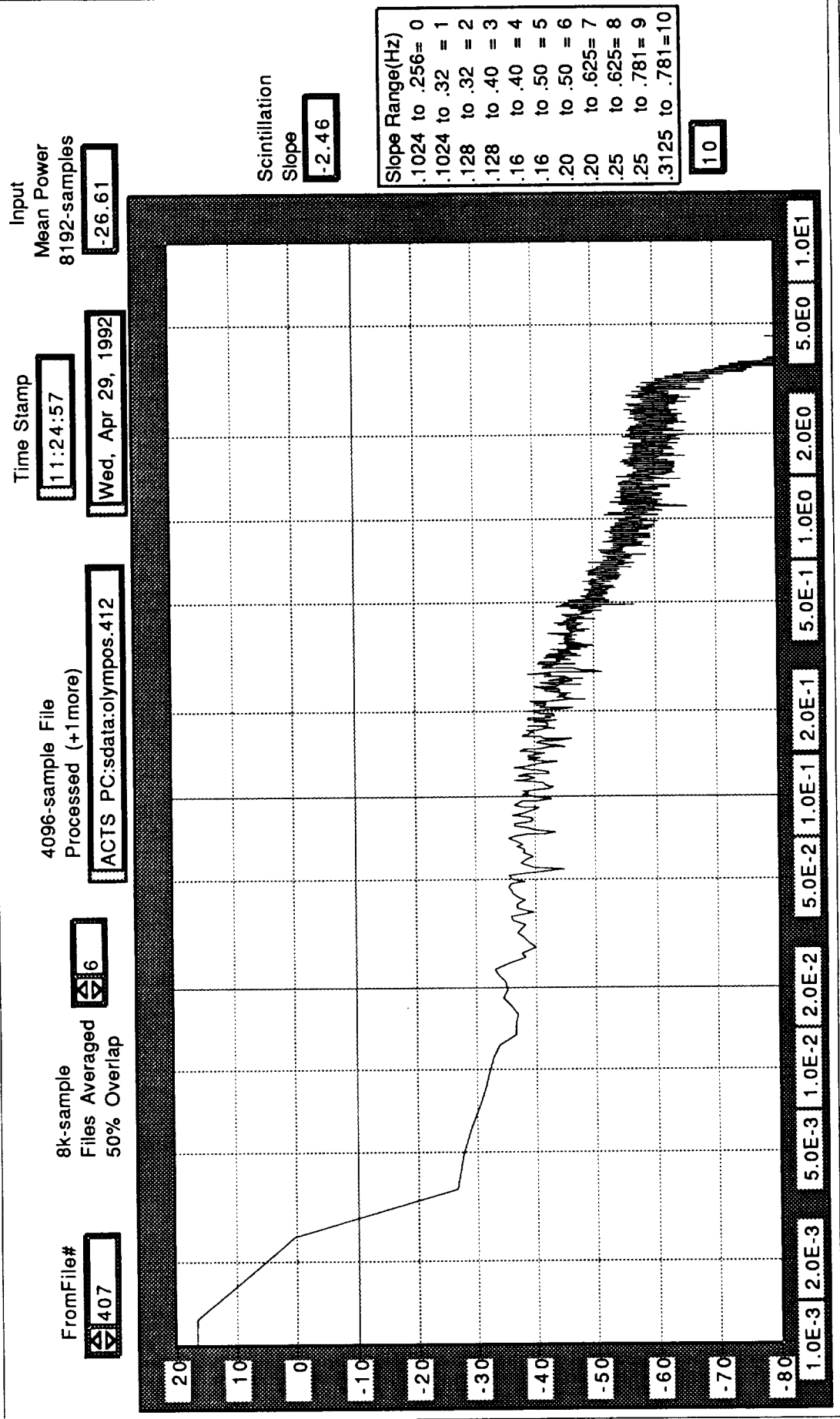
SATURDAY	MAY 2, 1992	17:00 NY TIME
FRIDAY	MAY 8, 1992	23:00 NY TIME
- o HAVE FOUND A NEW WAY TO OPEN DEMODULATOR LOOP FOR A FEW SECONDS VIA ACQUISITION I/O BOARD. THIS SEEMS TO HELP RELOCK RECEIVER. (HOWEVER, THIS IS YET TO BE IMPLEMENTED.)

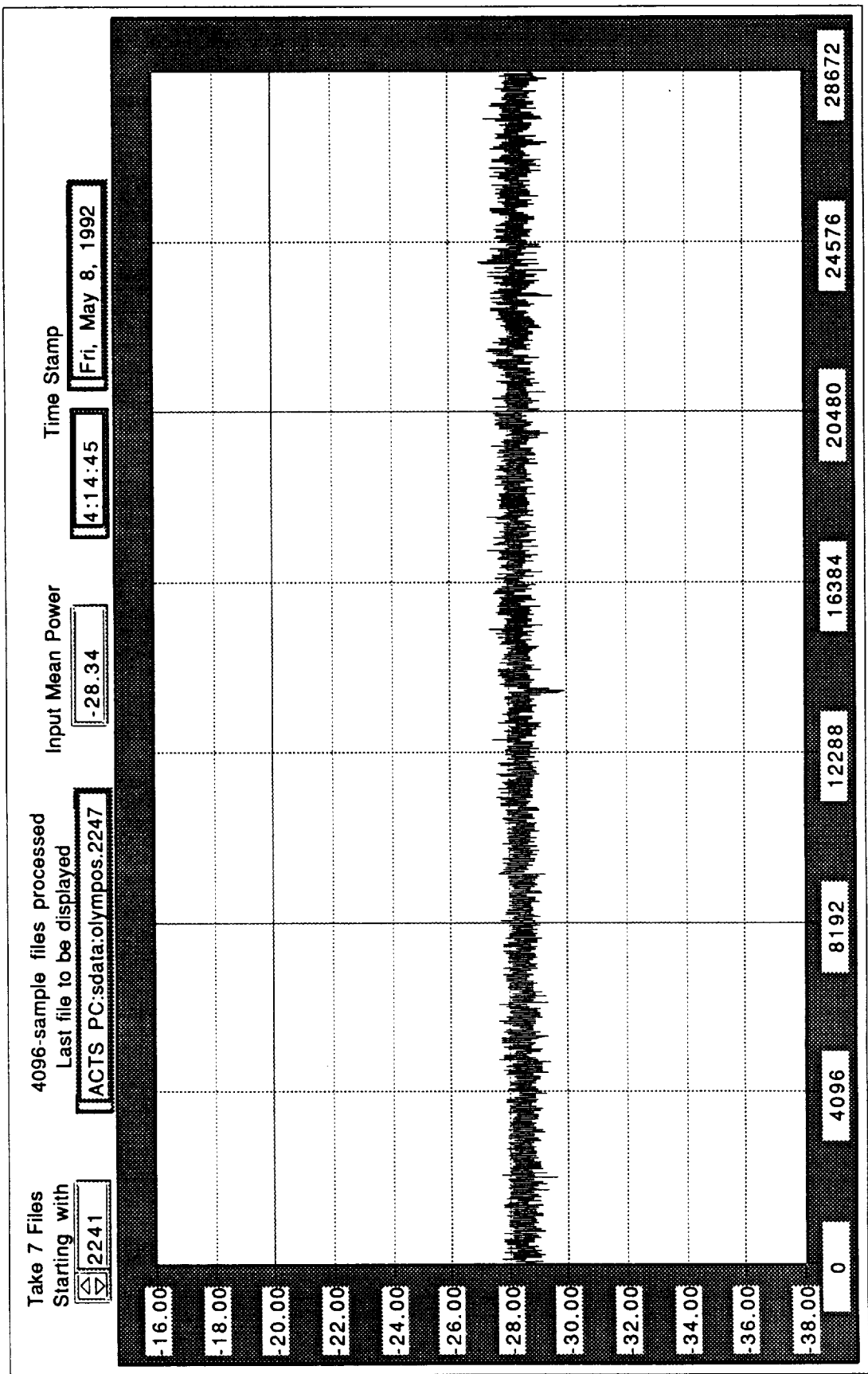
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TEMPORAL FREQ SPECTRA OF LOG-AMPLITUDE FLUCTUATIONS

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Tuesday, May 26, 1992 15:46

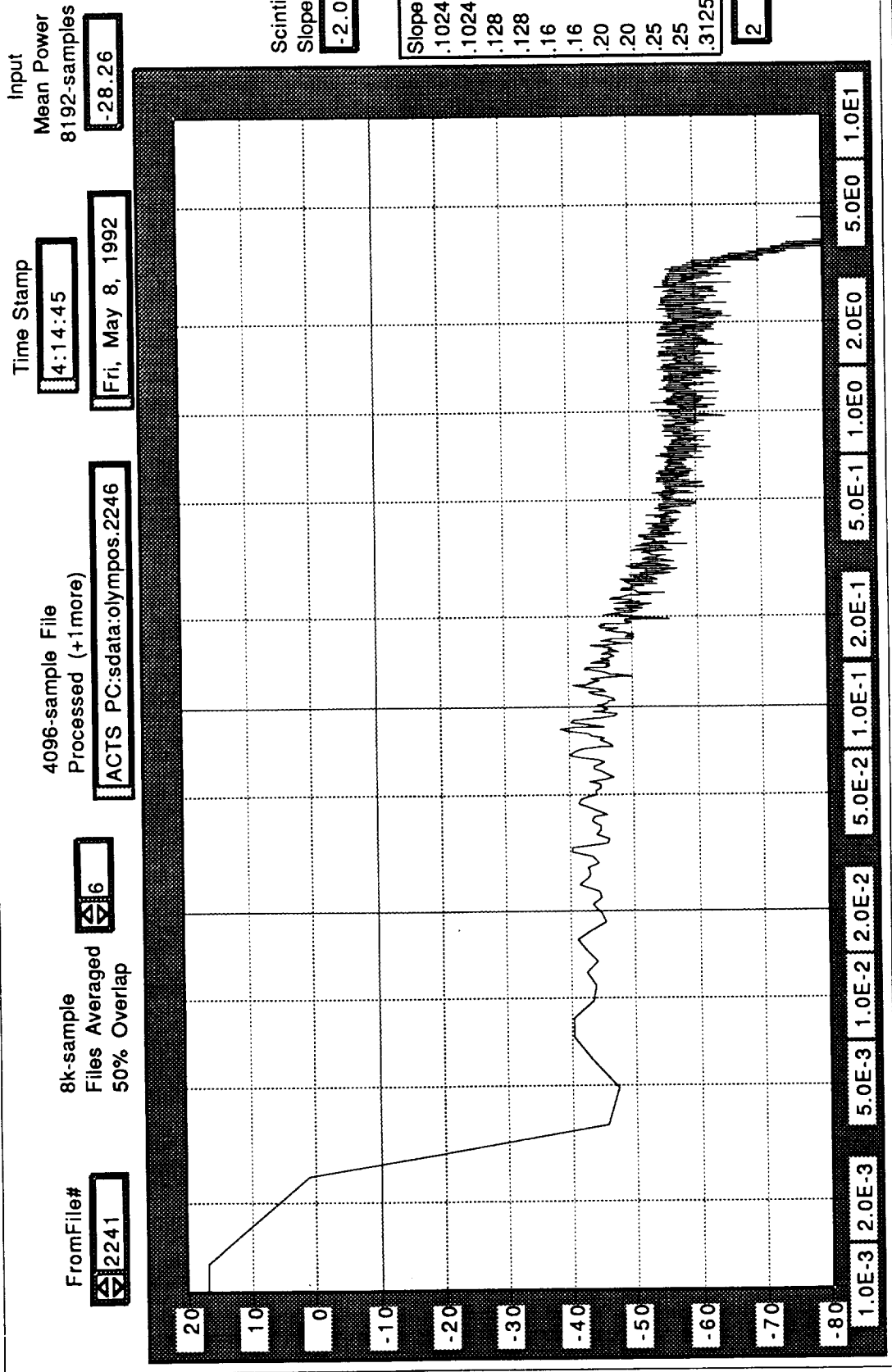


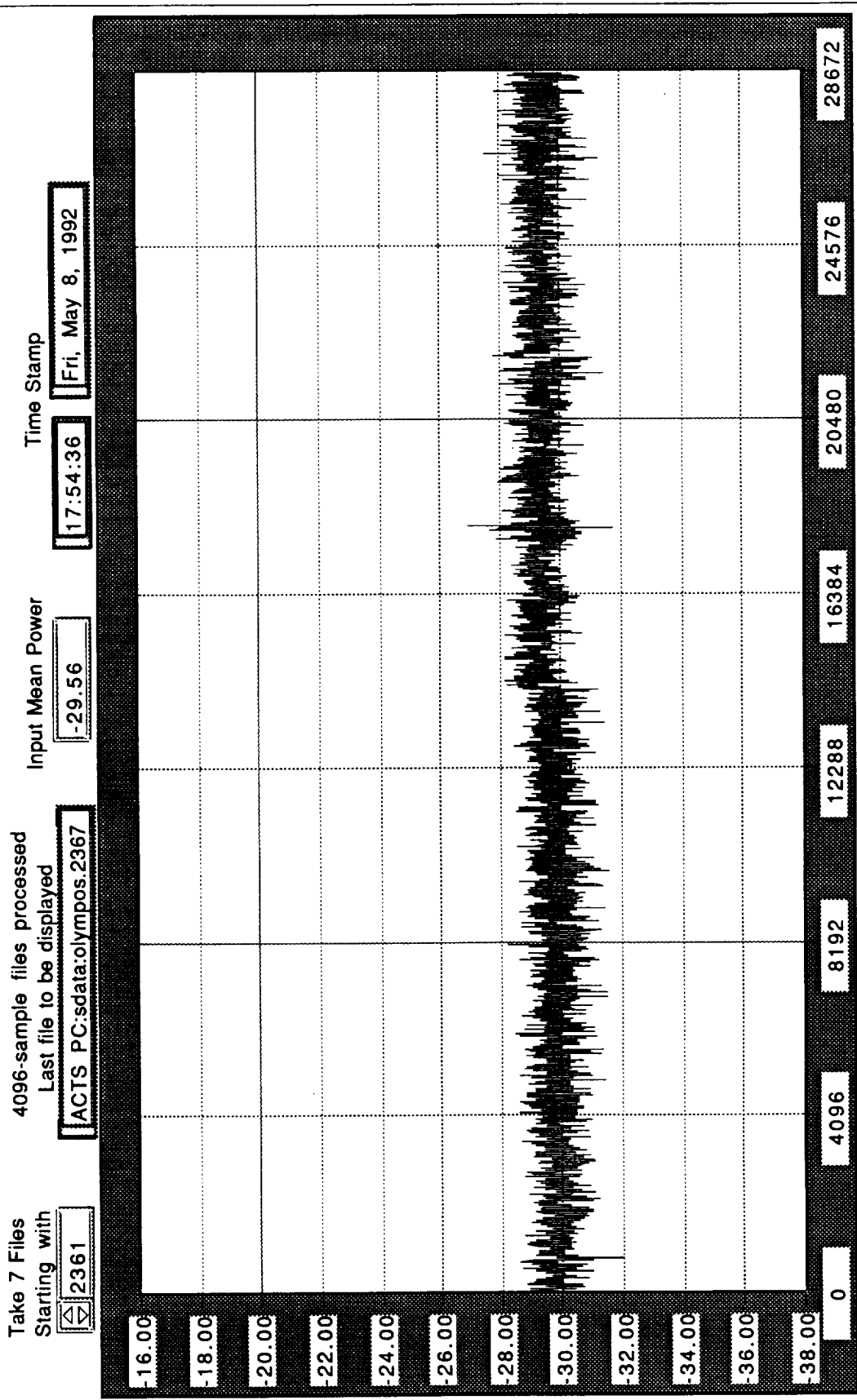


0.1 SEC SAMPLES SINCE "TIME STAMP"

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freq.domain
Tuesday, May 26, 1992 15:46





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 Tuesday, May 26, 1992 15:46
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